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TITLE: The Temporal Relationship Between Intrafamilial Violence, Deployment, and Serious Mental Illness in US Army Service Members

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14. ABSTRACT <p>Prior research has established an association between deployment and family violence, with insufficient evidence to identify when such violence occurs in relation to deployment and identification of mental illness in ADSM. This project will use: 1) longitudinal models to capture the temporal relationships between deployment, mental illness and family violence and 2) qualitative techniques to allow military stakeholders to evaluate Stage 1 findings and inform future interventions.</p> <p>This year we assembled our experts, obtained human subjects approvals, and acquired datasets. Through months of intensive data management, we cleaned, filled in missing data and summarized the study population across deployment, UIC, MOS and dependent data. We developed two domains for the longitudinal analysis 1) MOS classification – to assess risk of combat exposure, and 2) unit stability – a measure of social support. Despite delays, we remain on target with project goals. We anticipate imminent approvals for both TMA and ACR data. In addition to completing unit stability, we will finish the longitudinal data architecture in preparation for the arrival of TMA claims data. Once TMA data arrives, we will proceed in cleaning, filling in, summarizing, and encoding time-dependent events from the claims. We will then begin the multivariate longitudinal analysis.</p>					
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## **INTRODUCTION:**

While prior research has established an association between deployment and family violence, such research has been insufficient to identify when such violence occurs in relation to deployment and the identification of mental illness in Army soldiers. This two-stage, mixed-methods research project will use: 1) longitudinal models to capture the temporal relationships between deployment, mental illness and family violence as well as the specific mediators and moderators that alter one's risk for intrafamilial violence and 2) qualitative techniques based on a community-based participatory research framework that will allow military stakeholders to evaluate our Stage 1 findings and inform the implementation of future interventions.

## **BODY:**

### Personnel

We have assembled our team of experts that meet on a weekly basis to accomplish the project goals. This team is lead by the principal investigator, David Rubin, co-investigator, Sarah Frioux, and the project manager, Amanda O'Reilly. Our expert team is comprised of our biostatisticians, Marshall Joffe, Russell Localio and Kevin Lynch; our content experts, Richard Ross, Gerlinde Harb and Rich Gelles; and our data management team, Xianqun Luan, Lanyu Mi, and Jin Long. A search is currently underway for a part-time junior research assistant to provide support for this project.

### Budget:

We requested a suspension of work on this project in July 2011 while we assembled our data analysis team and worked to acquire data. Our request to resume work for our data management team from August 2011 and October 2011 for project faculty was granted in March 2012. We were further granted a 6-month extension of our first year project goals to account for these delays.

### Computer and Data Server

We purchased one new PC for the programmer/analyst, and purchased a new data workstation solely for data storage and data analysis for this project. Currently, all project data are saved on an offline data workstation. Only the authorized programmer/analyst on the project will have access to the data workstation. We are currently migrating limited datasets, stripped of all primary identifiers, to CHOP's Storage Area Network (SAN) for added data security, backup and computing power during the analysis phase of the study.

### Human Subjects Approvals (SOW Tasks 1 and 2)

We have received all necessary approvals from the Institutional Review Board (IRB) at The Children's Hospital of Philadelphia (CHOP), the Human Research Protection Program Office (HRPO), the Family Advocacy Research Subcommittee (FARS), and the Defense Manpower Data Center (DMDC) Human Subjects Protection Program official.

Our protocol is currently under review with the TRICARE Management Activity (TMA) Privacy Board.

#### Data Acquisition (SOW Task 3)

We have received approval from DMDC, ACR, ACSAP, and TMA for all data. We have received all data sets from DMDC and ACSAP. The data use agreement with TMA is currently under review by the TMA Privacy Office. We have been in contact with the TMA Privacy Office and we anticipate final approval in the upcoming month. The data use agreement with ACR has been executed, and we are currently negotiating the transfer of data from ACR to CHOP.

We have experienced some challenges in acquiring data from ACR. Our contact at ACR, Dr. Clayton Gable, had refused to release identifiable data to us citing privacy concerns but offered to link our data to theirs internally. However, this requirement was not included in their letter of approval and is not mentioned in the regulations governing FAP and data collection. His proposal would also violate our DUAs with other agencies. We had a conference call with Dr. Gable, Dr. Rene Robichaux at FAP, and our project team to review the DUA, present our data safety/security plan, and explain the necessity of including identifiers in the ACR data files. Drs. Gable and Robichaux understood our concerns and agreed to follow-up with FAP lawyers to review the provision for research in The Privacy Act of 1974 and ensure that our procedures were secure. We will follow-up with them immediately.

#### Data Preparation (SOW Task 4)

Since the middle of August 2011, our data team spent a considerable amount of time cleaning and conducting quality checks with the Army demographic, UIC, MOS, deployment and dependent data. Since the beginning of October 2011, our team of experts has met weekly to create a detailed work plan and to review the theoretical framework for the data analysis. Additionally the team began to identify mechanisms to measure key variables from the literature and from data available in this project. The data management team has worked to identify soldiers that meet the criteria for inclusion in the study cohort.

Furthermore, the team has cleaned, filled in missing data and summarized demographic, UIC, MOS, deployment and dependent data. Next, the team will construct a longitudinal dataset that merges elements from DMDC datasets for the purposes of setting up a stratified analysis once the TMA claims can be linked. The team will include two principle domains in the longitudinal analysis 1) MOS classification – to assess risk of combat exposure, and 2) unit stability – a measure of social support. These domains, along with other time invariant (demographics, dependent information, etc.) and time variant (deployments, drug screens, etc.) data elements, will comprise our longitudinal analysis dataset setup at a monthly level.

#### Data Summary (SOW Task 4)

There are 421,260 active duty service members (ADSM) currently identified for this study cohort. Each ADSM had a minimum of three consecutive years of active duty service from January 1, 2000 to December 31, 2007, and has at least one dependent. The median total duration for active duty for ADSM was 10 years. The median age at the first deployment during the study period was 27.6 years old. ADSM tended to be male (86%), White (56%) [African American (24%), Hispanic (10%), Other (10%)], Christian (73%), and had a maximum education of a high school diploma or GED (61%). More than half of ADSM were married (61%), most had at least one child (79%), and many had more than one child (53%). Thirty-nine percent of ADSM were found to have a dependent child with no spouse.

Seventy-four percent of ADSM had at least one deployment to Iraq or Afghanistan during the study period. The median number of deployments per ADSM was 2 each with a median duration of 9 months (inter quartile range 4-12 months). The median gap between deployments was 16 months (IQR 7-22 months), and the total cumulative duration of deployment during the study was 15 months (IQR 11-24 months). In general, deployments did not vary by demographic characteristics; however, men were deployed at a higher rate than women (74% vs. 52%).

As expected in the first half of 2001, there were no soldiers in the cohort deployed. Starting in September 2001, there is a steady increase in both the overall number of ADSM and the proportion of ADSM deployed (see Figures 1 and 2 below). From January 2001 to January 2005, there is a 21% increase in the number of ADSM in the cohort followed by a steady decline by the end of 2006. Similarly, by December 2005 approximately 30% of ADSM were deployed in Iraq or Afghanistan.

We focused much of our effort in recent months on cleaning and classifying MOS codes into risk groups. Many MOS codes had been converted during our study period and our goal was to reconcile all codes to the current coding structure. Next, we created an MOS classification structure with six risk groups ordered to reflect potential exposure to combat and therefore trauma: Combat Arms, Aviation, Combat Support, Medical, Combat Sustainment, and Other (see Appendix A for full MOS classification list). These groups are based on The Elements of Combat Power as outlined in the Army Field Manual 3-0 for Operations 2008<sup>1</sup>. The Army Field Manual groups Aviation under Combat Support and Medical under Combat Sustainment, but we parsed these groups into separate classes due to an increased risk of secondary exposure to combat and trauma.

Each ADSM was then assigned an MOS classification based on the highest risk group during deployment. For ADSM with no deployment, an MOS classification was assigned based on the highest risk group in general. Table 1 shows the distribution of ADSM across all six risk groups and the proportion of deployment.

**KEY RESEARCH ACCOMPLISHMENTS:**

- Assembled team of experts and meet weekly to accomplish study goals
- Received approval in March 2012 to resume work with a six-month extension
- Purchased computer, stored all data on offline workstation, and migrating limited datasets to CHOP's SAN.
- Received necessary human subjects approvals from CHOP, HRPO, FARS and DMDC; Under review at TMA.
- Acquired data from DMDC and ACSAP; Under review at TMA and ARC
- Merged, cleaned, filled in missing, and summarized DMDC data (deployment, UIC, MOS, dependents)
- Created MOS risk classifications

**REPORTABLE OUTCOMES:**

Not Applicable

**CONCLUSION:**

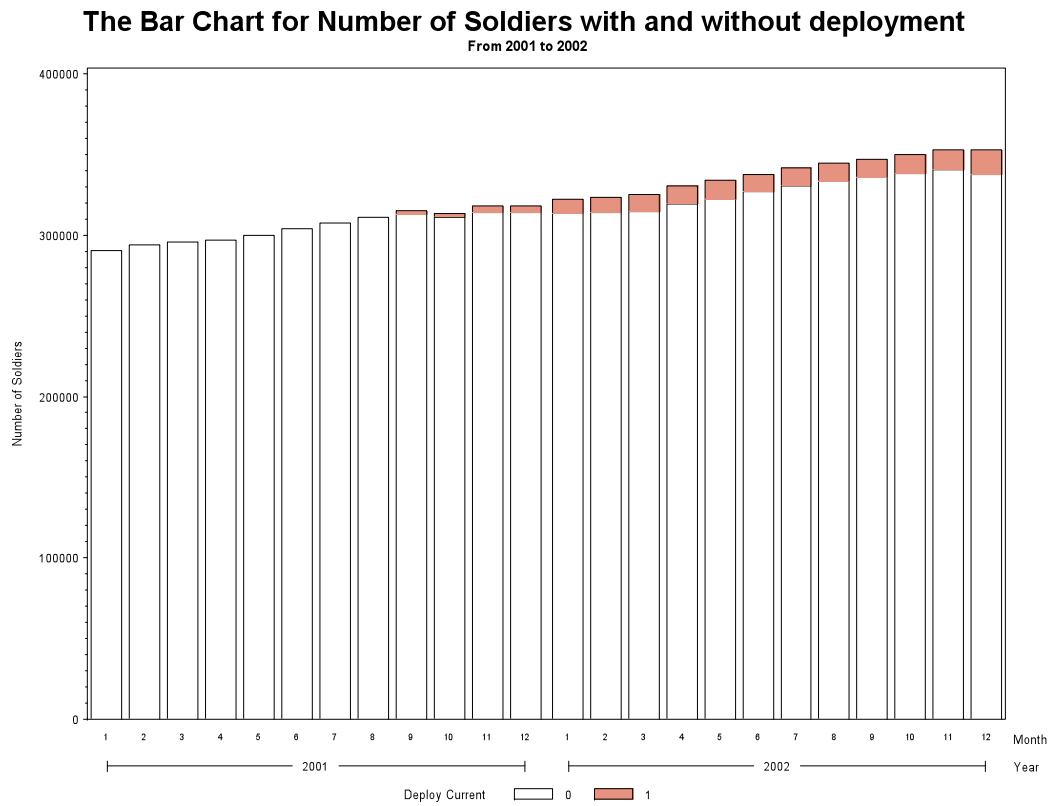
This year our work has focused on assembling our team of experts, obtaining necessary human subjects approvals, and acquiring datasets from various agencies. Through months of intensive data management, our data team has cleaned, filled in missing data and summarized DMDC datasets including deployment, UIC, MOS and dependent data. We also developed two domains for the longitudinal analysis 1) MOS classification – to assess risk of combat exposure, and 2) unit stability – a measure of social support. In the next quarter, we anticipate approvals for both TMA and ACR data imminently and without further challenge. Despite delays in acquiring TMA and ACR data, our team is on target with our project goals due to the intensive data management required for the four DMDC datasets. In addition to completing the unit stability domain in the upcoming quarter, our data management team will finish the longitudinal data architecture in preparation for the arrival of the TMA claims data. Once TMA data arrives, our team will proceed in cleaning, filling in, summarizing, and encoding time-dependent events from the claims. We will then begin the multivariate longitudinal analysis.

**REFERENCES:**

1. United States (2008). Operations: Field Manual 3-0, Washington, DC: Headquarters, Dept. of the Army. <http://downloads.army.mil/fm3-0/FM3-0.pdf>

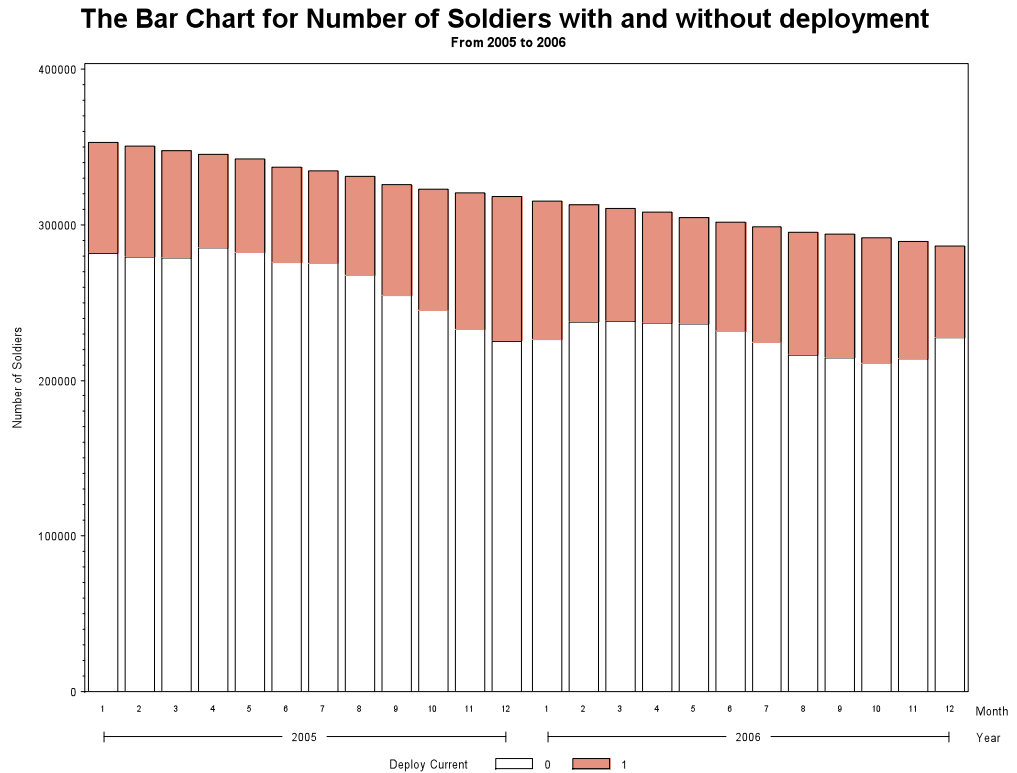
**SUPPORTING DATA:**

**Figure 1: Proportion of ADSM Deployed (1) and Non-Deployed (0) from January 2001 to December 2002.**





**Figure 2: Proportion of ADSM Deployed (1) and Non-Deployed (0) from January 2005 to December 2006.**



**Table 1: MOS Classification distribution of ADSM and proportion deployed**

MOS Classification	Percent	Percent Deployed
Combat Arms	28.9	78.0
Aviation	6.8	80.5
Combat Support	21.7	72.5
Medical	9.4	59.4
Combat Sustainment	29.4	76.2
Other	0.6	61.0
Missing/Unknown	3.4	66.5

## APPENDICES:

### A. MOS Classification List

## **Army MOS Classifications**

### **Combat Arms: (armed forces in direct land combat)**

- Infantry
- Armor (including armored cavalry)
- Field artillery
- Air defense artillery
- Combat engineers
- *Army aviation* (attack helicopters, air cavalry)

#### **C-MOS Codes:**

- 02 – Infantry
- 03 – Infantry
- 11 – Infantry
- 12 – Combat Engineers
- 13 – Field Artillery
- 14 – Air Defense
- 15 – Army Aviation (attack pilots)
- 16 – Air Cavalry
- 17 – Field Artillery
- 18 – Special Forces
- 19 – Armor/Cavalry
- 93 – Field Artillery
- 

### **Combat Support: (fire support & operational assistance)**

- Chemical Corps
- Corps of Engineers
- Military Intelligence Corps
- Military Police Corps
- Signal Corps
- *Army Aviation*

#### **CS-MOS Codes:**

- 09 – Native Language Speaker
- 12 – Engineering (Construction)
- 21 – Engineering (Construction)
- 24 – Signals (Communications) AOC
- 25 – Signals (Communications)
- 29 – Electronic Warfare
- 30 – Information Operations
- 31 – Law Enforcement

- 31 – Signals (Communications)
- 33 – Intelligence
- 34 – Intelligence
- 35 – Intelligence
- 36 – Signals Operations
- 37 – Psychological Operations
- 39 – Psychological Operations
- 47 – Chemical Warfare
- 52 – Nuclear Weapons
- 55 – Ammunitions
- 62 – Engineering/Construction
- 72 – Engineering
- 72 – Signals/Communications
- 74 – Chemical Weapons
- 74 – Signals/Communications
- 81 – Surveyors/Engineering
- 82 – Surveyors/Engineering
- 89 – Explosives and Ammunition
- 91 – Ammunition
- 95 – Law Enforcement
- 96 – Intelligence
- 97 – Intelligence
- 98 – Signals/Communication

**Combat Sustainment: (logistics – material, supply chain management, maintenance, transportation, health services)**

- Acquisition Corps
- Adjutant General Corps
- Chaplain Corps
- Finance Corps
- Judge Advocate General
- *Medical/Dental Corps*
- Ordnance Corps
- Quartermaster Corps
- Transportation Corps

**CSS-MOS Codes:**

- 02 – Band
- 04 - Immaterial
- 27 – Legal Services
- 27 – Mechanic/Repairer
- 35 - Repairer
- 36 – Finance

- 38 – Civil Affairs
- 39 – Repairer
- 41 – Program Management
- 41 - Repairer
- 42 – Administrative/HR
- 42 – Band
- 43 – HR
- 43 – Maintenance
- 44 – Finance
- 44 – Maintenance
- 45 – Finance
- 45 - Repairer
- 46 – Public Affairs
- 46 – Repairer
- 49 – Operations Research
- 50 – Force Development
- 51 – Supply/Logistics
- 52 – Repairer/Power Supply
- 53 – Systems Operations
- 54 – Operations
- 55 – Legal
- 57 – Operations Maintenance
- 59 – Strategy
- 63 – Mechanics
- 64 – Food Safety
- 67 – Repairer
- 68 – Waste Management
- 71 – Administration
- 71 – Legal
- 73 – Finance
- 75 – Administration
- 76 – Supply
- 77 – Supply
- 83 - Administration
- 88 – Transportation (Marine)
- 90 - Logistics
- 91 – Maintenance
- 92 – Supply and Logistics
- 94 – Electronic Missile Maintenance
- 97 - Contracts

**Army Aviation:****A-MOS Codes:**

- 15 – Army Aviation
- 23 – Hawk Mechanics
- 24 – Hawk Mechanics, Other Mechanics MOS
- 67 – Helicopter Repairer
- 68 – Aviation Repairer
- 93 – Air Traffic Control

**Army Medical:****M-MOS Codes:**

- 42 – Labs
- 56 – Religious Services
- 60 – Medical
- 61 – Medical
- 62 – Medical
- 63 – Dentist
- 64 – Veterinary
- 65 – Nutrition, PT, OT, PA
- 66 - Nursing
- 67 – Medical Sciences
- 68 – Medical
- 70 – Health Administration
- 71 – Medical Sciences
- 73 – Social Work, Psychologists
- 75 – Veterinary
- 91 – Medical Specialists
- 92 - Medical

**Other:****O-MOS Codes:**

- 09 – Students, trainees, etc.
- 40 – Space
- 47 – Professors
- 48 – Foreign Service
- 79 – Recruiting and Retention